REMARKS

Claims 23-34, 37-54, 56, and 58-65 are pending in the present application. Claims 1-22, 35, 36, 55, and 57 were previously canceled. Claims 23, 37 and 61 have been amended. Applicants respectfully request reconsideration of the claims in view of the following remarks.

CLAIMS 23-34

Claims 23-30, 33, and 34 have been rejected under 35 U.S.C. § 103(a) as assertedly being unpatentable over U.S. Patent Publication No. 2006/0141400 (hereinafter "Hirayama") in view of U.S. Patent Publication No. 2005/0084794 (hereinafter "Meagley"). Claims 31 and 32 have been rejected under 35 U.S.C. § 103(a) as assertedly being unpatentable over Hirayama in view of Meagley and U.S. Patent Publication No. 2005/0037269 (hereinafter "Levinson"). Applicants respectfully traverse these rejections.

Applicants reiterate that not all of the elements of claims 23-34 are taught by the cited references and that there it is improper to combine the cited references as explained in Applicants' response dated January 2, 2008. Applicants respectfully request that the Examiner review Applicants' arguments contained in Applicants' response dated January 2, 2008, along with the following remarks and withdraw the rejections of claims 23-34.

In response to Applicants arguments, the Examiner stated that "[w]hile Meagley does not state that the photoresist is completely or substantially diffused with the immersion fluid, it would be obvious that this would happen if the two were to sit for a certain period of time." Office Action, page 11. While this may be true, it is completely irrelevant.

Applicants' claim 23 recites, "directing optical energy . . . onto the photoresist layer *after* the photoresist layer has been *completely diffused* with the immersion fluid." This step not only

requires that the photoresist layer be completely diffused, but it also requires that the directing optical energy not be performed until after the photoresist layer has been completely diffused.

Applicants' specification explains that one of the benefits of waiting until the photoresist layer becomes completely diffused is to ensure uniformity. As explained in Applicants' specification, lithographic exposure performed by a step-and-expose scheme usually proceeds in a raster scan manner. Because of the time it takes to perform this process, the photoresist may have swollen to different thicknesses when processing different regions of the same wafer. As a result, different regions of the same wafer are not processed consistently and uniformly. *See, e.g.,* Applicants' specification, [0036]-[0037].

Assuming arguendo that the photoresist will be completely diffused if the two were to sit for a certain period of time as asserted by the Office Action, there is absolutely no disclosure or suggestion in any of the cited references regarding waiting until *after* the photoresist is completely diffused before the directing optical energy step is performed.

Nevertheless, Applicants have amended claim 23 to recite, "the directing not being started until after the photoresist layer has been completely diffused with the immersion fluid," in an attempt to move this case forward. By this amendment, Applicants make clear that the directing of optical energy onto the photoresist is performed *after* the photoresist has been completely diffused.

In view of the above comments, and those submitted in this case previously, Applicants respectfully request that the rejection of claim 23 be withdrawn. Claims 24-34 depend from and further limit claim 23 in a patentable sense, and accordingly, Applicants respectfully request that the rejections thereof be withdrawn as well.

CLAIMS 37-54

Claims 37-43, 46-50, and 53 have been rejected under 35 U.S.C. § 103(a) as assertedly being unpatentable over Hirayama in view of Meagley and U.S. Patent Publication No. 2005/0123863 (hereinafter "Chang"). Claims 44 and 45 have been rejected under 35 U.S.C. § 103(a) as assertedly being unpatentable over Hirayama, Meagley, Chang, and further in view of Levinson. Claims 51, 52, and 54 have been rejected under 35 U.S.C. § 103(a) as assertedly being unpatentable over Hirayaman, Meagley, Chang, and further in view of U.S. Patent No. 7,176,522 (hereinafter "Cheng"). Applicants respectfully traverse these rejections.

Applicants have amended claim 37 to recite "the patterning not being performed until after the immersion fluid is diffused substantially throughout the photoresist layer." Because the cited references fail to teach or suggest this limitation, as well as reasons similar to those discussed above with reference to claim 23, Applicants respectfully request that the rejection of claim 37 be withdrawn. Claims 38-54 depend from and further limit claim 37 in a patentable sense, and accordingly, Applicants respectfully request that the rejections thereof be withdrawn as well.

CLAIMS 56 and 58-65

Claims 56, 58-63, and 65 have been rejected under 35 U.S.C. § 103(a) as assertedly being unpatentable over Hirayama in view of Lee and U.S. Patent Publication No. 2002/0031319 (hereinafter "Wang"). Claim 64 has been rejected under 35 U.S.C. § 103(a) as assertedly being unpatentable over Hirayama in view of Lee, Wang, and Meagley. Applicants respectfully traverse these rejections.

In response to Applicants' previous arguments, the Office Action acknowledged that Hirayama fails to disclose that the upper portion of the photoresist layer is converted into a

treated layer. The Office Action, however, asserts that Lee discloses that a photoresist can be modified and that Wang discloses that a silicon dioxide layer can be grown. In doing so, it appears that the Examiner is attempting to piecemeal a rejection together.

"In determining the differences between the prior art and the claims, the question under 35 U.S.C. 103 is not whether the differences themselves would have been obvious, but whether the claimed invention as a whole would have been obvious." MPEP § 2142.02 (citations omitted). In other words, one simply cannot piece together individual references teaching a single element in a completely unrelated field to reject a claim.

In this case, Lee discloses treating the photoresist for stripping/removal, and Wang is related to growing an oxide layer and has nothing to do with treating a photoresist layer. By doing so, the Examiner has impermissibly ignored Applicants' invention as a whole and focused on the individual elements. Notably, there is no teaching or suggestion in the references for Applicants' invention as a whole.

This fact is highlighted by the Office Action's apparent disregard of Applicants' claim language. For example, Applicants' claim 61 recites "converting *only* an upper portion of the photoresist layer." Where is this taught or disclosed in the cited references? The Office Action admits that Hirayama fails to disclose this feature. As discussed above, Lee discloses modifying the photoresist prior to stripping or removal and is completely silent with regard to treating only the upper portion of the photoresist or, for that matter, treating a photoresist at all prior to immersing. Wang is related to growing an oxide layer and is completely irrelevant to treating a photoresist layer.

If this rejection is maintained, Applicants respectfully request additional information regarding how the Examiner is rejecting Applicants' claims. In particular, the Examiner

asserted, "The reference, Wang, has been added to teach that the upper portion of the photoresist can be converted into a treated layer rather than having a layer placed on top of the photoresist for protection." Office Action, page 12. How does Wang teach this? The section referred to by the Examiner in Wang discusses the formation and doping of an oxide layer. The doping is performed by masking the wafer and exposing the wafer to a germanium-based or fluorine-based chemical dopant. Wang compares the mask to a photoresist in that it acts as a mask to protect the underlying layer (i.e., the oxide layer in Wang). Notably, Wang says absolutely nothing about using a photoresist or converting only a top portion of a photoresist prior to immersing. Where is this taught in Wang?

Applicants also reiterate that Hirayama and Lee cannot be combined as asserted by the Office Action. The Office Action is apparently attempting to combine Lee's disclosure regarding modifying a photoresist for removal or stripping with Hirayama to show Applicants' recited limitation of treating a photoresist prior to immersing and patterning. If Lee's process were to be combined in this manner, then the photoresist would be *removed prior to immersing and patterning*, which would result in all of the photoresist being removed. As stated in the MPEP, "If the proposed modification would render the prior art invention being modified *unsatisfactory for its intended purpose*, then there is *no suggestion or motivation* to make the proposed modification." MPEP § 2143.01, emphasis added. Thus, the attempt by the Office Action is explicitly prohibited by the MPEP.

To put the Office Action's rejections in plain English, the Office Action is combining (1) a reference that teaches the use of a photoresist with (2) a method of *removing* the photoresist and (3) a method of *growing an oxide* to show "converting only an upper portion of the

photoresist layer" and then "immersing the semiconductor wafer in an immersion fluid." Clearly this is not correct.

If this rejection is maintained, Applicants respectfully request additional information regarding how the cited references may be combined in this manner to teach Applicants' invention.

Nevertheless, Applicants have amended independent claim 61 (from which claims 56, 58-60, and 62-65 depend) to recite "immersing the semiconductor wafer in an immersion fluid *after* the converting." By this amendment, Applicants clearly recite that only an upper portion of the photoresist layer is converted into a treated layer *and thereafter* the semiconductor wafer is immersed in an immersion fluid.

In view of the above remarks, Applicants respectfully request that the rejection of claim 61 be withdrawn. Claims 56, 58-60, and 62-65 depend from and further limit claim 61 in a patentable sense, and accordingly, Applicants respectfully request that the rejections thereof be withdrawn as well.

Applicants have made a diligent effort to place the claims in condition for allowance. However, should there remain unresolved issues that require adverse action, it is respectfully requested that the Examiner telephone Roger C. Knapp, Applicants' Attorney, at 972-732-1001, so that such issues may be resolved as expeditiously as possible. No fee is believed due in connection with this filing. However, should one be deemed due, the Commissioner is hereby authorized to charge, or credit any overpayment, to Deposit Account No. 50-1065.

Respectfully submitted,

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Date

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